



Annex P Placer County Flood Control and Water Conservation District

P.1 Introduction

This Annex details the hazard mitigation planning elements specific to Placer County Flood Control and Water Conservation District (PCFCWCD or District), a previously participating jurisdiction to the 2016 Placer County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the District. This Annex provides additional information specific to PCFCWCD, with a focus on providing additional details on the risk assessment and mitigation strategy for this community.

P.2 Planning Process

As described above, the District followed the planning process detailed in Chapter 3 of the Base Plan. In addition to providing representation on the Placer County Hazard Mitigation Planning Committee (HMPC), the District formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table P-1. Additional details on plan participation and District representatives are included in Appendix A.

Table P-1 PCFCWCD – Planning Team

Name	Position/Title	How Participated
Brad Brewer	District Manager	Attended meetings. Provided: hazard ID table, update to previous mitigation actions, new mitigation actions, input on assets at risk, updates to vulnerability sections of the Plan update. Reviewed and updated 2016 Annex and provided input on flood section of Base Plan.
Ken Grehm	Executive Director	Provided overall management of review and input.

Coordination with other community planning efforts is paramount to the successful implementation of this LHMP Update. This section provides information on how the District integrated the previously approved 2016 Plan into existing planning mechanisms and programs. Specifically, the District incorporated into or implemented the 2016 LHMP through other plans and programs shown in Table P-2.

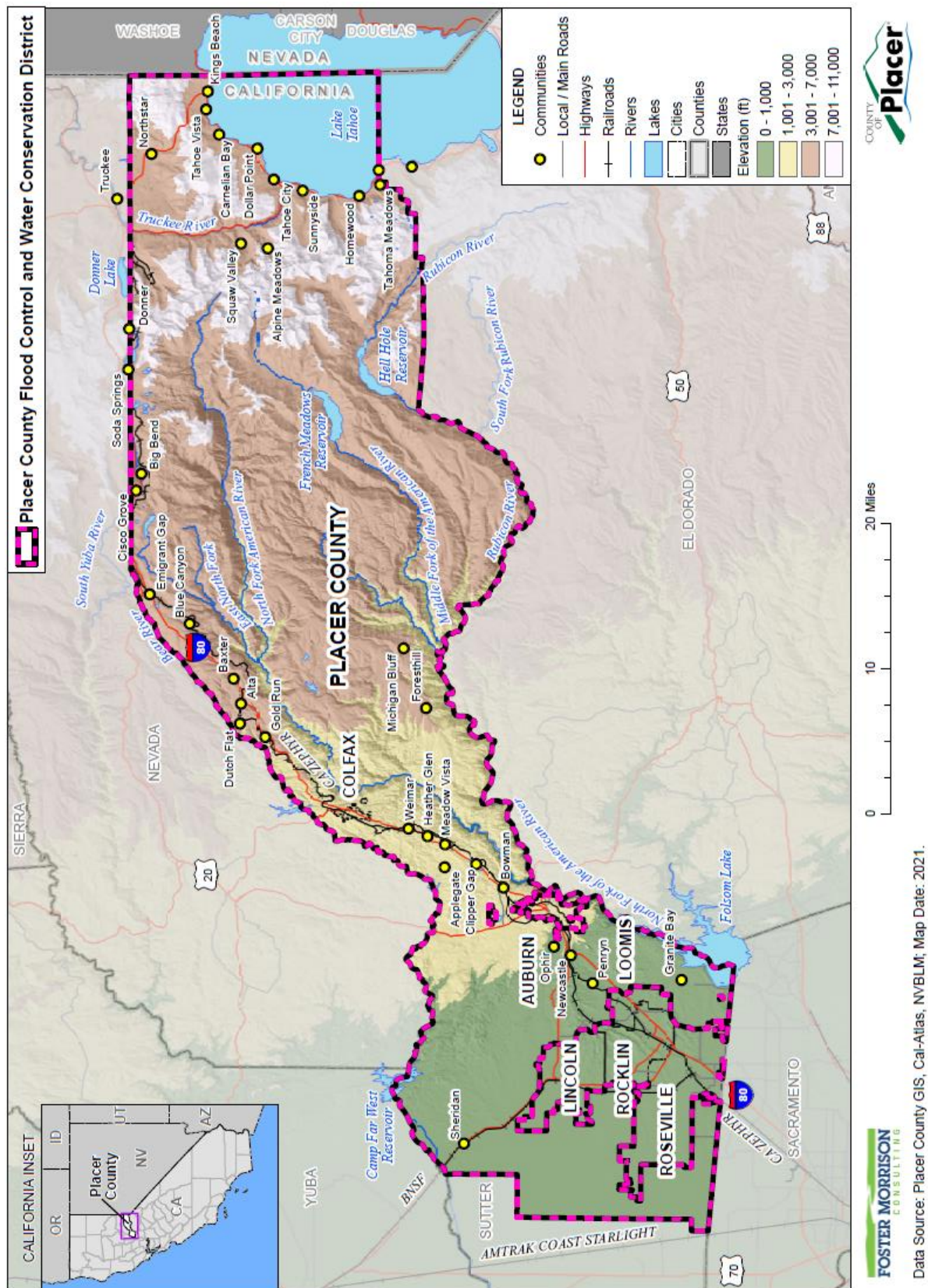
Table P-2 2016 LHMP Incorporation

Planning Mechanism 2016 LHMP Was Incorporated/Implemented In.	Details: How was it incorporated?
District's Annual Short-term and Long-Term (5-year) Work Plans	Incorporated updates to previous mitigation actions and new mitigation actions. Include future updates to LHMP into Short-Term or Long-Term Work Plans as needed
Annual Updates to District's Flood Response Handbook	Included updates to hazards, mitigation actions, assets at risk, and vulnerability from Plan update.

P.3 District Profile

The District profile for the PCFCWCD is detailed in the following sections. Figure P-1 displays a map and the location of the District within Placer County.

Figure P-1 PCFCWCD



P.3.1. Overview and Background

The Placer County Flood Control and Water Conservation District was established in 1984 by the State Legislature as a Special District, separate from County government, to address flood control issues arising with growth. District boundaries are the same as Placer County boundaries.

The primary purpose of the District is to protect lives and property from the effects of flooding by comprehensive, coordinated flood prevention planning. The District uses consistent standards to evaluate flood risk, and implements flood control measures such as requiring new development to construct detention basins and operation and management of a flood warning system.

The District:

- Implements regional flood control projects;
- Develops and implements master plans for selected watersheds in the County;
- Provides technical planning, support and information during times of flood and drought for the cities, the County, and the development community;
- Operates and maintains the County flood warning system;
- Reviews proposed development projects to see they meet District standards;
- Develops hydrologic and hydraulic models for County watersheds; and
- Provides technical support for Office of Emergency Services activities.

P.4 Hazard Identification

PCFCWCD identified the hazards that affect the District and summarized their location, extent, frequency of occurrence, potential magnitude, and significance specific to District (see Table P-3).

Table P-3 PCFCWCD—Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/Severity	Significance	Climate Change Influence
Agriculture Pests and Diseases	–	–	–	–	Medium
Avalanche	–	–	–	–	Medium
Climate Change	–	–	–	–	–
Dam Failure	Significant	Unlikely	Critical	High	Medium
Drought & Water Shortage	Significant	Likely	Critical	Medium	High
Earthquake					Low
Floods: 1%/0.2% annual chance	Significant	Occasional	Critical	High	Medium
Floods: Localized Stormwater	Significant	Likely	Limited	Medium	Medium
Landslides, Mudslides, and Debris Flows	–	–	–	–	Medium
Levee Failure	Significant	Unlikely	Limited	Medium	Medium
Pandemic	–	–	–	–	Medium
Seiche	–	–	–	–	Medium
Severe Weather: Extreme Heat	–	–	–	–	High
Severe Weather: Freeze and Snow	–	–	–	–	Medium
Severe Weather: Heavy Rains and Storms	Extensive	Likely	Critical	Medium	Medium
Severe Weather: High Winds and Tornadoes	–	–	–	–	Low
Tree Mortality	–	–	–	–	High
Wildfire	Extensive	Highly Likely	Limited	Medium	High
<p>Geographic Extent Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area</p> <p>Likelihood of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year, or happens every year. Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.</p> <p>Magnitude/Severity Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid</p> <p>Significance Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact</p> <p>Climate Change Influence Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact</p>					

Impacts of past events and vulnerability to specific hazards are discussed below (see Section 4.3 of the Base Plan for more detailed information about these hazards and their impacts on Placer County).

P.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile the District's hazards and assess the District's vulnerability separate from that of the Placer County Planning Area as a whole, which has already been assessed in Section 4.3 Hazard Profiles and Vulnerability Assessment in the Base Plan. The hazard profiles in the Base Plan discuss overall impacts to the Placer County Planning Area and describes the hazard problem description, hazard location and extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the District is included in this Annex. This vulnerability assessment analyzes the property and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the Base Plan.

P.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section P.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard (as shown in Table P-3) affects the District and includes information on past hazard occurrences and the likelihood of future hazard occurrence. The intent of this section is to provide jurisdictional specific information on hazards and further describes how the hazards and risks differ across the Placer County Planning Area.

P.5.2. Vulnerability Assessment and Assets at Risk

This section identifies the District's total assets at risk, including values at risk, populations at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the District. This data is not hazard specific, but is representative of total assets at risk within the District.

Assets at Risk and Critical Facilities

This section considers the PCFCWCD's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this Plan. Critical facilities are defined for this Plan as:

Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.

This definition is further refined by separating out three classes of critical facilities:

Class 1 facilities include those facilities that contribute to command, control, communications and computer capabilities associated with managing an incident from initial response through recovery.

Class 2 facilities include those facilities that house Emergency Services capabilities.

Class 3 facilities are those facilities that enable key utilities and can be used as evacuation centers/shelters/mass prophylaxis sites, etc.

Additional information on the three classes of critical facilities is described further in Section 4.3.1 of the Base Plan.

Table P-4 lists critical facilities and other District assets identified by the District Planning Team as important to protect in the event of a disaster. PCFCWCD's physical assets, valued at \$5 million, consist of the infrastructure to support the District's operations.

Table P-4 PCFCWCD Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Replacement Value	Which Hazards Pose Risk
Stream and rain gages	ALERT type gage (17 gages @\$12,000 each)	\$204,000	Theft, vandalism, damage due to flooding
Base station hardware	ALERT base station receiver/decoder and computer	\$22,000	Damage due to fire
Miners Ravine Off-Channel Detention Basin Facility and Dam	Regional Flood Control Facility	\$4,800,000	Damages due to flooding or dam failure
Antelope Flood Control Project, Upper Weir	Regional Flood Control Facility	\$2,400,000	Damages due to flooding
Total		\$7,426,000	

Source: PCFCWCD

Populations Served

Also potentially at risk should the District be affected by natural hazard events are the populations served by the District. PCFCWCD provides services to 396,691 residents of Placer County (CA Dept. of Finance, May 2020) including Auburn, Colfax, Lincoln, Loomis, Rocklin, and Roseville.

Natural Resources

PCFCWCD has a variety of natural resources of value to the District. These natural resources parallels that of Placer County as a whole. Information can be found in Section 4.3.1 of the Base Plan

Historic and Cultural Resources

PCFCWCD has a variety of historic and cultural resources of value to the District. These historic and cultural resources parallels that of Placer County as a whole. Information can be found in Section 4.3.1 of the Base Plan.

Growth and Development Trends

General growth in the District parallels that of the Placer County Planning Area as a whole. Information can be found in Section 4.3.1 of the Base Plan. Future expansion will include expanding flood warning system to include additional ALERT flood warning gages.

Development since 2016

Three new flood warning gages were installed in FEMA Special Flood Hazard Areas since 2016. These include Clover Valley Creek at Rawhide Road, Miners Ravine at Auburn Folsom Road, and Linda Creek at Auburn Folsom Road. One flood warning gage previously operated and maintained by the District (Pleasant Grove Creek at Industrial Avenue) was transferred to the City of Roseville.

Future Development

The District has no control over future development in areas the District services. Future development in these areas parallels that of the Placer County Planning Area. More general information on growth and development in Placer County as a whole can be found in “Growth and Development Trends” in Section 4.3.1 Placer County Vulnerability and Assets at Risk of the Base Plan.

P.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table P-3 as high or medium significance hazards. Impacts of past events and vulnerability of the District to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Placer County Planning Area). Methodologies for evaluating vulnerabilities and calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the District to each identified priority hazard, in addition to the estimate of likelihood of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.

- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, and future development.

Dam Failure

Likelihood of Future Occurrence—Unlikely

Vulnerability—High

Hazard Profile and Problem Description

Dams are manmade structures built for a variety of uses including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they are usually engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped or fail. Overtopping is the primary cause of earthen dam failure in the United States.

Location and Extent

Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, a total dam failure would most probably happen as a consequence of the natural disaster triggering the event, such as an earthquake. There is no scale with which to measure dam failure. However, Cal DWR Division of Safety of Dams (DOSD) assigns hazard ratings to dams within the State that provides information on the potential impact should a dam fail. The following two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. Dams are classified in four categories that identify the potential hazard to life and property: Low, Significant, High, and Extremely High. These were discussed in more detail in Section 4.3.9 of the Base Plan.

While a dam may fill slowly with runoff from winter storms, a dam break has a very quick speed of onset. The duration of dam failure is generally not long – only as long as it takes to empty the reservoir of water the dam held back. The District would be affected for as long as the flood waters from the dam failure took to drain downstream.

Dams inside the County that can affect the District can be seen on Figure P-2. Dams outside the County that can affect the District can be seen on Figure P-3.

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Local Hazard Mitigation Plan Update
May 2021

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Past Occurrences

There has been no federal or state disaster declarations for dam failure in the County. The District noted no other dam failure occurrences that have affected the District.

Vulnerability and Impacts from Dam Failure

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Impacts to the District from a dam failure flood could include loss of life and injury, flooding and damage to property and structures, damage to critical facilities and infrastructure, loss of natural resources, and all other flood related impacts. Additionally, mass evacuations and associated economic losses can also be significant.

Assets at Risk

Those agency assets located within flood inundation areas are the most vulnerable to extensive flooding caused by a dam failure. These include the District's ALERT system of stream level and rain gages listed in Table P-4, as well as the land improvements associated with the District's Miners Ravine Off-Channel Detention Basin Facility and dam located at 7500 Sierra College Boulevard in Roseville, California. A specific dam failure analysis prepared for the State Division of Safety of Dams exists for the District's Miners Ravine Off-Channel Detention Basin Facility and dam as prepared by RBF Consulting in October 2004.

Drought & Water Shortage

Likelihood of Future Occurrence—Likely

Vulnerability—Medium

Hazard Profile and Problem Description

Drought is a complex issue involving many factors—it occurs when a normal amount of precipitation and snow is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects. Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for agriculture, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Location and Extent

Drought and water shortage are regional phenomenon. The whole of the County, as well as the whole of the District, is at risk. The US Drought Monitor categorizes drought conditions with the following scale:

- None
- D0 – Abnormally dry

- D1 – Moderate Drought
- D2 – Severe Drought
- D3 – Extreme drought
- D4 – Exceptional drought

Drought has a slow speed of onset and a variable duration. Drought can last for a short period of time, which does not usually affect water shortages and for longer periods. Should a drought last for a long period of time, water shortage becomes a larger issue. Current drought conditions in the District and the County are shown in Section 4.3.10 of the Base Plan.

Past Occurrences

There has been one state and one federal disaster declaration due to drought since 1950. This can be seen in Table P-5.

Table P-5 Placer County – State and Federal Disaster Declarations Summary 1950-2020

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Drought	1	2014	1	1977

Source: Cal OES, FEMA

Since drought is a regional phenomenon, past occurrences of drought for the District are the same as those for the County and includes 5 multi-year droughts over an 85-year period. Details on past drought occurrences can be found in Section 4.3.10 of the Base Plan.

Vulnerability to and Impacts from Drought and Water Shortage

Based on historical information, the occurrence of drought in California, including the District, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts can be extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. Drought impacts are wide-reaching and may be economic, environmental, and/or societal. Tracking drought impacts can be difficult.

The most significant qualitative impacts associated with drought in the Placer County Planning Area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Mandatory conservation measures are typically implemented during extended droughts. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. With a reduction in water, water supply issues based on water rights becomes more evident. Climate change may create additional impacts to drought and water shortage in the County and the District.

During periods of drought, vegetation can dry out which increases fire risk. Drought that occurs during periods of extreme heat and high winds can cause Public Safety Power Shutoff (PSPS) events to be declared in the County. More information on power shortage and failure can be found in the Severe Weather: Extreme Heat Section below, as well as in Section 4.3.2 of the Base Plan.

Assets at Risk

Flood warning system stream and rain gages, Miners Ravine Off-Channel Detention Basin Facility and Dam are at risk to this hazard.

Flood: 1%/0.2% Annual Chance

Likelihood of Future Occurrence—Occasional/Unlikely

Vulnerability—High

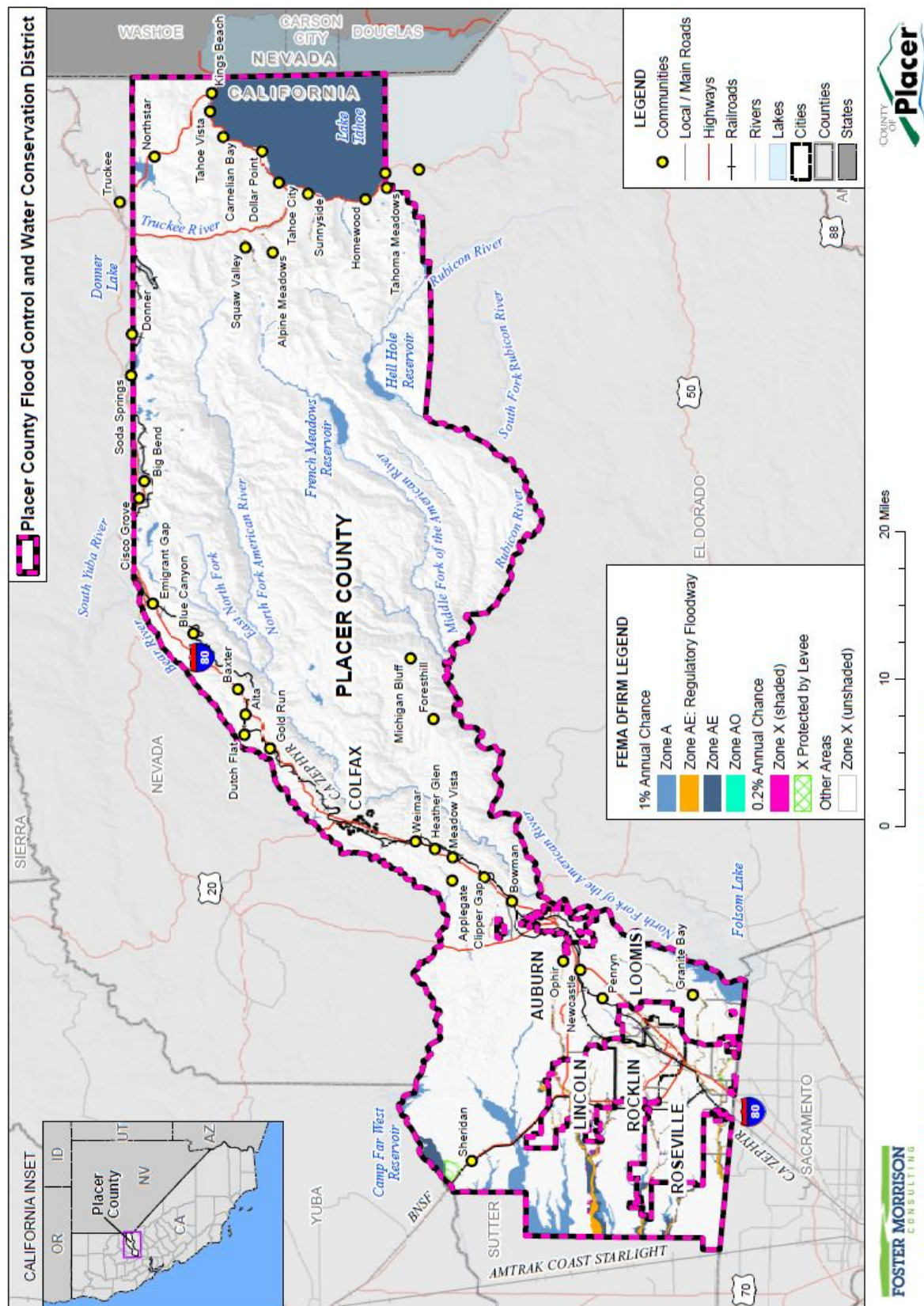
Hazard Profile and Problem Description

This hazard analyzes the FEMA DFIRM 1% and 0.2% annual chance floods. These tend to be the larger floods that can occur in the County or in the District, and have caused damages in the past. Flooding is a significant problem in Placer County and the District. Historically, the District has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall and snowmelt runoff. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. Occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. As previously described in Section 4.3.12 of the Base Plan, the Placer County Planning Area and the PCFCWCD have been subject to historical flooding.

Location and Extent

Since the PCFCWCD boundaries are the same as the County, the PCFCWCD has areas located in the 1% and 0.2% annual chance floodplain. This is seen in Figure P-4.

Figure P-4 PCFCWCD – FEMA DFIRM Flood Zones



Data Source: FEMA DFIRM 11/2/2018, Placer County GIS, Cal-Atlas, NVBLM; Map Date: 2021.

Table P-6 details the DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the District.

Table P-6 PCFCWCD– DFIRM Flood Hazard Zones

Flood Zone	Description	Flood Zone Present in the District
A	Areas subject to inundation by the 1% annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.	X
AE	Areas subject to inundation by the 1% annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.	X
AE – Regulatory Floodway	Areas subject to inundation by the 1% annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply. Different from AE in that it adds the water course and adjacent lands that must be reserved in order to discharge the base flood without increasing the water surface elevation by more than one foot.	X
AH	An area inundated by 1% annual chance flooding (usually an area of ponding), for which BFEs have been determined; flood depths range from 1 to 3 feet	X
AO	Areas subject to inundation by 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet	X
Shaded X	500-year flood the areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood	X
X Protected by Levee	An area determined to be outside the 500-year flood and protected by levee from 100-year flood	X
X	Areas outside of known floodplains.	X

Source: FEMA

Additionally, flood extents can generally be measured in volume, velocity, and depths of flooding. Expected flood depths in the District vary, depending on the nature and extent of a flood event; specific depths are unknown. Flood durations in the District tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Flooding in the District tends to have a shorter speed of onset, due to the amount of water that flows through the District.

Flooding due to heavy rains and snow runoff has been a historical problem in the Placer County Planning Area. Abundant snowfall in the mountains combined with rain and steep terrain can mean rapid runoff and

flooding in the mountainous eastern section of the County. Of particular concern in this area of the County are rain-on-snow type events producing high runoff volumes. In the more heavily populated western portion of the County, flooding is often the result of heavy rains over lower permeability soils found within the relatively large Dry Creek and Cross Canal watersheds. Many of the small creeks within these watersheds respond quickly to heavy rains in the winter season producing peak flood flows within relatively short time frames. The historical practice of development within or in close proximity to floodplains has resulted in frequent and repeated flood losses in specific areas.

Past Occurrences

A list of state and federal disaster declarations for Placer County from flooding is shown on Table P-7. These events also likely affected the District to some degree.

Table P-7 Placer County – State and Federal Disaster Declarations from Flood 1950-2020

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	16	1950, 1955, 1958 (twice), 1962, 1963, 1969, 1973, 1980, 1983, 1986, 1995 (twice), 1997, 2008, 2017	13	1955, 1958, 1962, 1964, 1969, 1983, 1986, 1995 (twice), 1997, 2006 (twice), 2017

Source: Cal OES, FEMA

Significant flooding events resulting in federal disaster declarations for Placer County occurred in 1986, 1995, and 1997, with the most substantial damages occurring within the Cross Canal, Dry Creek, and Truckee River watersheds. The primary impacts from flooding within the District boundaries include damage to roads, utilities, bridges; and flooding of homes, businesses and critical facilities. Road closures create difficulties in providing emergency services to areas cut off by flooding and limit the area's ability to evacuate. 2017 saw significant flooding due to atmospheric river storms that occurred in January and February of that year. PCFCWCD staff helped staff the EOC and monitored the District's flood warning system and ALERT gages. The 2017 event damaged the Morton Road culvert crossing over Canyon Creek that necessitated an emergency repair.

Vulnerability to and Impacts from Flood

Floods have been a part of the District's historical past and will continue to be so in the future. During winter months, long periods of precipitation and the timing of that precipitation are critical in determining the threat of flood, and these characteristics further dictate the potential for widespread structural and property damages. Predominantly, the effects of flooding are generally confined to areas near the waterways of the County. As waterways grow in size from local drainages, so grows the threat of flood and dimensions of the threat. This threatens structures in the floodplain. Structures can also be damaged from trees falling as a result of water-saturated soils. Electrical power outages happen, and the interruption of power causes major problems. Loss of power is usually a precursor to closure of governmental offices and community businesses. Roads can be damaged and closed, causing safety and evacuation issues. People may be swept away in floodwaters, causing injuries or deaths.

Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Floodwaters can transport large objects downstream which can damage or remove stationary structures. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to crops, roads, foundations, and electrical circuits. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Joe Rogers Road area adjacent to Miners Ravine and Cross Canal watershed/structures, residences, and/or roads inundated with flood waters are the areas most impacted by flooding.

Assets at Risk

With respect to District-owned assets, areas subject to stormwater flooding are the biggest concern. District assets at the greatest risk include those listed in Table P-4.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Likely

Vulnerability–Medium

Hazard Profile and Problem Description

Flooding occurs in areas other than the FEMA mapped 1% and 0.2% annual chance floodplains. Flooding may be from drainages not studied by FEMA, lack of or inadequate drainage infrastructure, or inadequate maintenance. Localized, stormwater flooding occurs throughout the County during the rainy season from November through April. Prolonged heavy rainfall contributes to a large volume of runoff resulting in high peak flows of moderate duration.

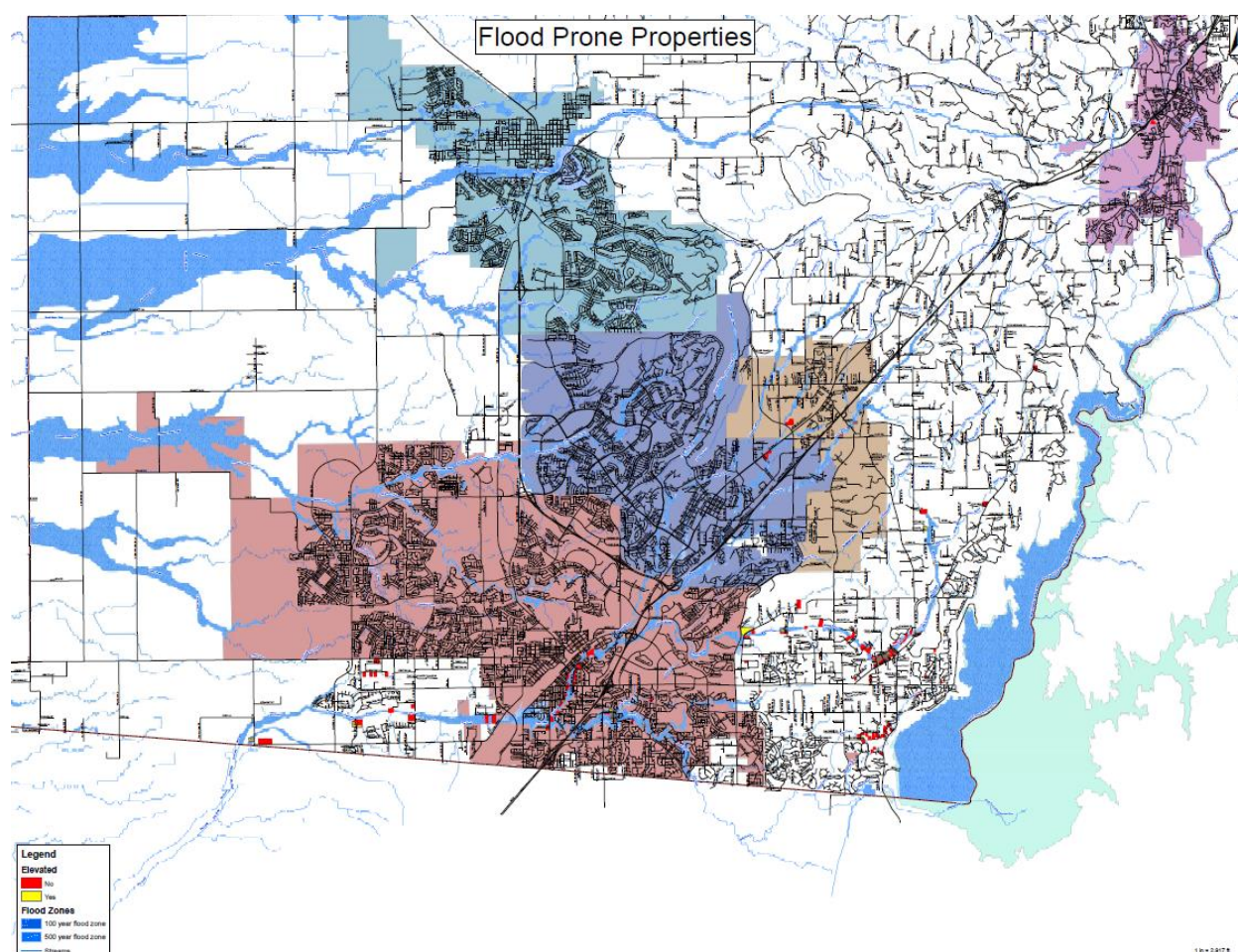
Location and Extent

The PCFCWCD is subject to localized flooding throughout the District. Flood extents are usually measured in areas affected, velocity of flooding, and depths of flooding. Expected flood depths in the District vary by location. Flood durations in the District tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Localized flooding in the District tends to have a shorter speed of onset, especially when antecedent rainfall has soaked the ground and reduced its capacity to absorb additional moisture.

Past Occurrences

There have been no federal or state disaster declarations in the County due to localized flooding. The District has a map of flood prone properties. These are shown on Figure P-5.

Figure P-5 PCFCWCD – Flood Prone Properties



\Source: PFCFWCD

The District noted the following past occurrences of localized flooding:

- Flooding within Western Placer County, Auburn, and the North Lake Tahoe area in 2017.

Vulnerability to and Impacts from Localized Flooding

Historically, much of the growth in the District and County has occurred adjacent to streams, resulting in significant damages to property, and losses from disruption of community activities when the streams overflow. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff.

Primary concerns associated with stormwater flooding include life safety issues, and impacts to property and to infrastructure that provides a means of ingress and egress throughout the community. Ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical infrastructure. Objects can also be buried or destroyed through sediment deposition. Floodwaters can break utility lines and interrupt services. Standing water can cause damage to crops, roads, and foundations.

Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Impacts to the District include damage to ALERT flood warning system gages and Miners Ravine Off-Channel Detention Facility.

Assets at Risk

The District noted that the flood warning system stream and rain gages, Miners Ravine Off-Channel Detention Basin Facility and Dam are most at risk from this hazard.

Levee Failure

Likelihood of Future Occurrence—Unlikely

Vulnerability—Medium

Hazard Profile and Problem Description

A levee is a raised area that runs along the banks of a stream or canal. Levees reinforce the banks and help prevent flooding by containing higher flow events to the main stream channel. By confining the flow to a narrower stream channel, levees can also increase the speed of the water. Levees can be natural or man-made.

Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe weather events or dam failure. For example, levees can be certified to provide protection against the 1% annual chance flood. Levees reduce, not eliminate, the risk to individuals and structures located behind them. A levee system failure or overtopping can create severe flooding and high water velocities. Levee failure can occur through overtopping or from seepage issues resulting from burrowing rodents, general erosion, excessive vegetation and root systems and other factors that compromise the integrity of the levee. No levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

Location and Extent

There is not a scientific scale or measurement system in place for levee failure. Expected flood depths from a levee failure in the District vary by event and location. The speed of onset is slow as the river rises, but if a levee fails the warning times are generally short for those in the inundation area. The duration of levee failure risk times can be hours to weeks, depending on the river flows that the levee holds back. When northern California dams and reservoirs are nearing maximum capacity, they release water through the river systems, causing additional burdens on County levees. Levees in the District were shown in Section 4.3.15 of the Base Plan.

Past Occurrences

There have been no federal or state disaster declarations from levee failure. The District Planning Team noted no past occurrences of levee failures.

Vulnerability to and Impacts from Levee Failure

A levee failure can range from a small, uncontrolled release to a catastrophic failure. Levee failure flooding can occur as the result of prolonged rainfall and flooding. The primary danger associated with levee failure is the high velocity flooding of those properties outside and downstream of the breach.

Should a levee fail, some or all of the area protected by the levees would be at risk to flooding. Impacts from a levee failure include property damage, critical facility damage, and life safety issues. Business and economic losses could be large as facilities could be flooded and services interrupted. School and road closures could occur. Road closures would impede both evacuation routes and ability of first responders to quickly respond to calls for aid. Other problems connected with levee failure flooding include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Assets at Risk

No District assets (from Table P-4) are at risk from this hazard.

Severe Weather: Heavy Rains and Storms (Hail, Lightning)

Likelihood of Future Occurrence—Highly Likely

Vulnerability—Medium

Hazard Profile and Problem Description

Storms in the District occur annually and are generally characterized by heavy rain often accompanied by strong winds and sometimes lightning and hail. Approximately 10 percent of the thunderstorms that occur each year in the United States are classified as severe. A thunderstorm is classified as severe when it contains one or more of the following phenomena: hail that is three-quarters of an inch or greater, winds in excess of 50 knots (57.5 mph), or a tornado. Heavy precipitation in the District falls mainly in the fall, winter, and spring months.

Location and Extent

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the District. All portions of the District are at risk to heavy rains. Most of the severe rains occur during the fall, winter, and spring months. There is no scale by which heavy rains and severe storms are measured. Magnitude of storms is measured often in rainfall and damages. The speed of onset of heavy rains can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of severe storms in California, Placer County, and the District can range from minutes to hours to days. Information on precipitation extremes can be found in Section 4.3.4 of the Base Plan.

Past Occurrences

There have been past disaster declarations from heavy rains and storms, which were discussed in Past Occurrences of the flood section above. According to historical hazard data, severe weather, including heavy rains and storms, is an annual occurrence in the District. This is the cause of many of the federal disaster declarations related to flooding.

Significant events include the heavy rains occurring during December 2005 into January 2006. An estimated 2-year rain event in January 2008 resulted in approximately \$14,000 worth of hillside erosion and drainage repairs at the District's Miners Ravine Off-Channel Detention Basin Facility.

Vulnerability to and Impacts from Heavy Rain and Storms

Heavy rain and severe storms are the most frequent type of severe weather occurrences in the District. These events can cause localized flooding. Elongated events, or events that occur during times where the ground is already saturated can cause 1% and 0.2% annual chance flooding. Wind often accompanies these storms and has caused damage in the past. Hail and lightning are rare in the District.

Actual damage associated with the effects of severe weather include impacts to property, critical facilities (such as utilities), and life safety. Heavy rains and storms often result in localized flooding creating significant issues. Roads can become impassable and ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical infrastructure. Floodwaters and downed trees can break utilities and interrupt services.

During periods of heavy rains and storms, power outages can occur. These power outages can affect pumping stations and lift stations that help alleviate flooding. More information on power shortage and failure can be found in Section 4.3.2 of the Base Plan.

District specific concerns is damage to ALERT flood warning system gages and Miners Ravine Off-Channel Detention Facility.

Assets at Risk

With respect to District-owned assets, areas subject to stormwater flooding caused by heavy rains and storms are the biggest concern. District assets at the greatest risk include those listed in Table P-4.

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–

Hazard Profile and Problem Description

Wildland fire and the risk of a conflagration is an ongoing concern for the PCFCWCD. Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the

ecosystem. Wildland fires affect grass, forest, and brushlands, as well as any structures located within them. Where there is human access to wildland areas the risk of fire increases due to a greater chance for human carelessness and historical fire management practices. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months; however, in recent years, the risk of wildfire has become a year around concern. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. While wildfire risk has predominantly been associated with more remote forested areas and wildland urban interface (WUI) areas, significant wildfires can also occur in more populated, urban areas.

Location and Extent

Wildfire can affect all areas of the District. CAL FIRE has estimated that the risk varies across the District and has created maps showing risk variance. Following the methodology described in Section 4.3.19 of the Base Plan, wildfire maps for the PCFCWCD were created. Figure P-6 shows the CAL FIRE FHSZ in the District. As shown on the maps, fire hazard severity zones within the District range from urban unzoned to high.

Placer County Flood Control and Water Conservation District

LEGEND

- Communities
- Local / Main Roads
- Highways
- Railroads
- Rivers
- Lakes
- Cities
- Counties
- States

FIRE HAZARD SEVERITY ZONES

- Very High
- High
- Moderate
- Non-Wildland/Non-Urban
- Urban Unzoned

PLACER COUNTY

COLFAX

AUBURN

LINCOLN

ROCKLIN

ROSEVILLE

LOOMIS

YUBA

SUTTER

SIERRA

NEVADA

CALIFORNIA

WASHOE

CARSON CITY

DOUGLAS

TRUCKEE

NORTHSTAR

Tahoe Vista

Carmelian Bay

Dollar Point

Tahoe City

Sunnyside

Homewood

Tahoma Meadows

Hall Hole Reservoir

French Meadows Reservoir

Alpine Meadows

Squaw Valley

Donner

Soda Springs

Big Bend

Emigrant Gap

Blue Canyon

Barter

Alta

Dutch Flat

Gold Run

Michigan Bluff

Foresthill

Weimar

Heather Glen

Meadow Vista

Bowman

Applegate

Clipper Gap

Ophir

Newcastle

Pennyn

Granite Bay

Folsom Lake

Camp Far West Reservoir

AMTRAK COAST STARLIGHT

SIERRA

NEVADA

CALIFORNIA

WASHOE

CARSON CITY

DOUGLAS

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Blue Canyon

Barter

Alta

Dutch Flat

Gold Run

Michigan Bluff

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Wildfires tend to be measured in structure damages, injuries, and loss of life as well as on acres burned. Fires can have a quick speed of onset, especially during periods of drought or during hot dry summer months. Fires can burn for a short period of time, or may have durations lasting for a week or more.

Past Occurrences

There has been five state and six federal disaster declarations for Placer County from fire. These can be seen in Table P-8.

Table P-8 Placer County – State and Federal Disaster Declarations Summary 1950-2020

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Fire	5	1961, 1965, 1973, 1987, 2010	6	2002, 2004, 2008, 2009, 2014 (twice)

Source: Cal OES, FEMA

Any smoke/air quality issues that coincided with operation and maintenance of the ALERT flood warning system that typically occurs in October and November of each year. Poor air quality makes it difficult for District and contractor staff to perform operations and maintenance.

Vulnerability to and Impacts from Wildfire

Risk and vulnerability to the Placer County Planning Area and the District from wildfire is of significant concern, with some areas of the Planning Area being at greater risk than others as described further in this section. High fuel loads in the Planning Area, combined with a large built environment and population, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and potentially catastrophic fires. During the nearly year around fire season, the dry vegetation and hot and sometimes windy weather results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the County and the District, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Potential impacts from wildfire include loss of life and injuries; damage to structures and other improvements, natural and cultural resources, croplands, and loss of recreational opportunities. Wildfires can cause short-term and long-term disruption to the District. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the District by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality. Fires can also affect air quality in the District; smoke and air pollution from wildfires can be a severe health hazard.

Although the physical damages and casualties arising from large fires may be severe, it is important to recognize that they also cause significant economic impacts by resulting in a loss of function of buildings and infrastructure. Economic impacts of loss of transportation and utility services may include traffic delays/detours from road and bridge closures and loss of electric power, potable water, and wastewater

services. Schools and businesses can be forced to close for extended periods of time. Recently, the threat of wildfire, combined with the potential for high winds, heat, and low humidity, has caused PG&E to initiate PSPSs which can also significantly impact a community through loss of services, business closures, and other impacts associated with loss of power for an extended period. More information on power shortage and failure can be found in the Severe Weather: Extreme Heat Section above, as well as in Section 4.3.2 of the Base Plan. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

The District is concerned about damage to ALERT flood warning system gages and Miners Ravine Off-Channel Detention Facility. Debris flows in waterways following a wildfire can create culvert and bridge blockage causing damage to County road infrastructure.

Assets at Risk

Those Agency assets at greatest risk to wildland fire include the ALERT system of stream and rain gages listed in Table P-4.

P.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

P.6.1. Regulatory Mitigation Capabilities

Table P-9 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the PCFCWCD.

Table P-9 PCFCWCD Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan/General Plan	N/A	N/A
Capital Improvements Plan	Y	Annual Short-term and 5-year Long-Term Work Plans; used to implement mitigation actions
Economic Development Plan	N/A	N/A
Local Emergency Operations Plan	Y	Annual updates to District's Flood Response Handbook; not used to implement mitigation actions
Continuity of Operations Plan	Y	Annual District Timeline of Operations
Transportation Plan	N/A	N/A

Stormwater Management Plan/Program	Y, 1990	District's Stormwater Management Manual (SWMM) and Amendments
Engineering Studies for Streams	Y, Varies	2011 Updated Dry Creek Watershed Flood Control Plan, 1992 Auburn Bowman Community Plan Hydrology Study, 1994 Placer/Sutter County Joint Study Auburn Ravine, Raccoon and Pleasant Grove Creeks
Community Wildfire Protection Plan	N/A	N/A
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N/A	N/A
Building Code, Permitting, and Inspections	Y/N	Are codes adequately enforced?
Building Code	N/A	Version/Year: N/A
Building Code Effectiveness Grading Schedule (BCEGS) Score	N/A	Score: N/A
Fire department ISO rating:	N/A	Rating: N/A
Site plan review requirements	N/A	N/A
		Is the ordinance an effective measure for reducing hazard impacts?
Land Use Planning and Ordinances	Y/N	Is the ordinance adequately administered and enforced?
Zoning ordinance	N/A	See Placer County Requirements
Subdivision ordinance	N/A	See Placer County Requirements
Floodplain ordinance	N/A	See Placer County Requirements
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N/A	See Placer County Requirements
Flood insurance rate maps	N/A	See Placer County Requirements
Elevation Certificates	N/A	See Placer County Requirements
Acquisition of land for open space and public recreation uses	N/A	See Placer County Requirements
Erosion or sediment control program	N/A	See Placer County Requirements
Other		
How can these capabilities be expanded and improved to reduce risk?		
The District is pursuing updates to outdated stream engineering studies such as for the entire Cross Canal watershed. This includes Auburn Ravine, Raccoon Creek, and Pleasant Grove Creek in addition to Curry Creek and Markham Ravine. These watershed study updates allow for the for the detailed evaluation of regional flood control and other mitigation projects along with the impacts and needed mitigation for development. The future update to the Stormwater Management Manual will help the District and agencies within Placer County better define engineering design standards.		

Source: PCFCWCD

As indicated above, the District has several programs, plans, policies, codes and ordinances in place. These include regional watershed wide flood control plans and a county-wide stormwater management manual. The District, working cooperatively with Placer County and other local agencies, developed three major flood control plans in the early 1990's which cover a majority of the watersheds within western Placer

County. In addition to the Plans listed below the District maintains and references a number of detailed local drainage studies from its library.

FEMA Floodplain Mapping

The Flood Control and Water Conservation District is collaborating with FEMA through the Cooperating Technical Partners (CTP) Program in order to maintain up-to-date floodplain mapping and other flood hazard information within Placer County. The main objective of the program is to provide new or improved 1 percent annual chance floodplain, or 100-year, mapping of major creeks within developing areas of the County. Through three CTP efforts, over 120 miles of new or updated mapping will be provided in urbanized areas of the County. The creeks to be studied were prioritized through the District Technical Advisory Committee (TAC) consisting of member agency staff that identified the need for new or updated areas of floodplain mapping.

The District often leads the initial hydrologic studies which serve as the basis for the updated or new mapping produced separately by FEMA's mapping contractors. District staff have been providing regular updates regarding the CTP process to the District Board and cooperating member agencies at public Board of Director meetings. Placer County is the first jurisdiction to receive the new FEMA Digital Flood Insurance Rate Map (DFIRM) format which replaces the current paper map format. The DFIRMs are being released simultaneous to the CTP mapping studies depicting the new or updated 1 percent annual chance floodplain.

Areas being studied for remapping include:

- Western Placer County
- Lake Tahoe Area

Stormwater Management Manual

For policy, guidelines, specific design criteria for the development and management of natural resources, drainage facilities, and infrastructure for stormwater management please download the current version of the Placer County Flood Control & Water Conservation District Stormwater Management Manual (SWMM) (a link to our SWMM is on the District's website page at www.placer.ca.gov). There is currently a planned update to the SWMM to meet Senate Bill 5 and Urban Level of Flood Protection (ULOP) requirements, amongst other necessary updates.

Dry Creek Watershed Flood Control Plan

The purpose of the 1992 Dry Creek Watershed Flood Control Plan is to provide the District and other governmental agencies in both Placer and Sacramento Counties with the information and policies necessary to manage flood waters within the Dry Creek Watershed, which includes Miners Ravine, Linda Creek, Secret Ravine, Antelope Creek, Cirby Creek, and Dry Creek. The Plan evaluates existing flooding problems and identifies flood management options as well as a funding mechanism to achieve Plan recommendations. The plan was first drafted in 1992 and updated for re-publication in 2011. This plan may be found on the District's website.

Placer/Sutter County Joint Flood Study Auburn Ravine, Coon and Pleasant Grove Creeks (Cross Canal Watershed Flood Control Plan)

The purpose of the 1994 Cross Canal Watershed Flood Control Plan is to provide the District and other governmental agencies in both Placer and Sacramento Counties with the information and policies necessary to manage flood waters within the Cross Canal Watershed, which includes Pleasant Grove, Auburn Ravine, Markham Ravine, and Raccoon Creek. The Plan evaluates existing flooding problems and identifies flood management options as well as a funding mechanism to achieve Plan recommendations.

Auburn/Bowman Community Plan Hydrology Study

The purpose of the 1992 Auburn Bowman Community Plan Hydrology Study is to provide the District and other governmental agencies in Placer County with the information and policies necessary to manage flood waters within the study area, which includes Auburn Ravine, Mormon Ravine, Dutch Ravine, and many other tributaries. The Plan evaluates existing flooding problems and identifies flood management options as well as a funding mechanism to achieve Plan recommendations.

Antelope Creek Flood Control Project

The District is working on a regional flood control project, which includes the addition of two fish-friendly, on-channel weirs across Antelope Creek. The first weir or "Upper Weir" was completed in February 2018. The District is seeking grant funding to complete the second "Lower Weir". Features of this project include:

- Slight increase to the footprint of the existing FEMA recognized 100-year floodplain limits
- Provides substantial mitigation for increases in urban runoff and peak flood flow increases due to new and existing development in the watershed
- Provides as much as 800 cubic feet per second of 100-year peak flow decrease in downtown Roseville
- Includes stream channel and habitat restoration components
- Includes removal of non-native plants and re-planting with natives
- Includes improved public access and educational opportunities for the public along the existing multi-use recreational trail
- Funded through grants from the State Department of Water Resources (DWR), Proposition 84 IRWM program, the DWR Urban Streams Restoration Program and watershed mitigation fees collected within the Dry Creek Trust Fund

Countywide Grading Ordinance, 2000

A countywide grading ordinance was completed in 1988. It has since been adopted by the County and cities and last updated in 2000 as Article 15.48 of the County Code.

Placer County Flood Damage Prevention Regulations

Placer County has adopted Flood Damage Prevention Regulations, Article 15.52 of the County Code, which have as its purpose “to promote public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas.” The regulations provide specific construction and development standards for flood hazard reduction in areas of special flood hazard.

Flood Response Handbook with Flood Hazard Awareness Maps

The District, in conjunction with its member agencies, has developed a Flood Response Handbook (FRH) that includes Flood Hazard Awareness Maps of the unincorporated area and all cities. The FRH details roles, responsibilities, and processes for responding to a flood event.

Flood Hazard Awareness Maps (FHAM) have been created by the District for the purposes of identifying areas of the western County where flood hazards from local creeks are known to exist. The maps delineate the established FEMA 100-year and 500-year floodplains (where established) including a 250 foot setback limit from the 100-year floodplain. The setback limit was selected to assist emergency responders and planners in identifying local flood hazard areas, but is not a regulatory limit. Critical emergency response facilities including police and fire stations are shown as are other facilities which may be useful during a flooding event including hospitals, schools, churches and miscellaneous public facilities. Street crossings potentially impacted by flooding are also highlighted in red and the locations of sand bags for flood fighting purposes are also shown. The District intends to update these maps periodically as new information becomes available.

Placer County Flood Prone Map

The District and its member agencies have developed a database and GIS mapping of both residential and commercial structures that are subject to damage from repeat flooding events. The database on these properties has been developed over the years beginning with the 1986 flood event and is helpful in identifying these properties and general flood hazard areas. The database includes information (where available and recorded) on high water, finished floor elevations, previous flooding impact, and whether or not the structure had been elevated or not through a FEMA sponsored HMGP grant program. A GIS based mapping of these flood prone properties has been created and is color coded to indicate structures that have already been elevated versus those that have not. The mapping is useful in identifying flood hazard areas where it can be expected that most of the flood fighting and emergency response efforts will be focused. It is also useful in planning future flood mitigation strategies, elevation projects and regional flood control projects.

Flood Response Handbook

The District has also created, and annually updates its own Flood Response Handbook (FRH). The FRH addresses emergency communication procedures, emergency material supplies and equipment availability, technical resources, and data to help predict flooding events, and State level emergency operations manuals. The FRH also contains countywide GIS based Flood Hazard Awareness Mapping including areas of known flooding, locations of critical facilities such as police and fire stations, government centers, schools, nursing homes, and hospitals. Roads subject to flooding closures and preferred evacuation routes are also identified. This mapping is also posted at the County's Emergency Operations Center (EOC) and distributed to our member agencies.

P.6.2. Administrative/Technical Mitigation Capabilities

The District is governed by a nine-person board of directors. Members include a representative from each of the six incorporated cities in Placer County, two representatives from the Board of Supervisors and one member-at-large appointed by the Board of Supervisors.

The Cities, the County and the District have adopted a formal coordination agreement to identify responsibilities. There are two District Advisory Committees. The Policy Advisory Committee (PAC) has seven voting members - the six city managers of the incorporated cities and the County Executive Officer. The PAC provides guidance on policy and program issues that affect all jurisdictions. The Technical Advisory Committee (TAC) is composed of representatives of Placer County, incorporated cities, Placer County Resource Conservation District, Placer County Water Agency, Sacramento County Water Agency, Nevada Irrigation District, Sutter County Flood Control and Water Conservation District, and the Reclamation District 1001. The TAC is relied on for technical analysis and interpretation of ideas, policies, and programs.

The State legislation creating the District allows Placer County employees to act as District employees. There are three District staff members: the District Manager; the Development Coordinator; and the District Secretary. The Placer County Director of Public Works serves as the Executive Director of the District. Table P-10 identifies the District department(s) responsible for activities related to mitigation and loss prevention in PCFCWCD.

Table P-10 PCFCWCD's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N/A	N/A
Mitigation Planning Committee	N/A	N/A
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	District staff manage the County's annual stream channel maintenance program
Mutual aid agreements	N/A	See Placer County Requirements
Other	Y	District Board of Directors and Technical Advisory Committee
Staff	Y/N FT/PT	Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	N/A	Utilize resources of Placer County
Floodplain Administrator	N/A	Utilize resources of Placer County
Emergency Manager	N/A	Utilize resources of Placer County
Community Planner	N/A	Utilize resources of Placer County
Civil Engineer	Y	District Manager and Development Coordinator have Civil Engineering backgrounds with hazards and mitigation training. Staff coordinate effectively with other agencies within Placer County and utilize additional staff resources from Placer County

GIS Coordinator	N/A	Utilize resources of Placer County, Development Coordinator provides internal GIS support
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Everbridge flood warning system, ALERT system of precipitation and stream level gages
Hazard data and information	Y	District's Flood Response Handbook – Updated Annually
Grant writing	Y	District has received FEMA CTP grants, State DWR Prop 84 IRWM grants, DWR Flood Corridor Protection Program grant, DWR Flood Emergency Response Project grant, and DWR USRP grant
Hazus analysis	N	N/A
Other		
How can these capabilities be expanded and improved to reduce risk?		
Expansion and update of ALERT flood warning system will help to better monitor and respond to flood events. Continuing to pursue flood inundation forecasting software systems will allow for better flood emergency planning and response.		

Source: PCFCWCD

P.6.3. Fiscal Mitigation Capabilities

Table P-11 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table P-11 PCFCWCD's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	District's General Fund
Authority to levy taxes for specific purposes	N	N/A
Fees for water, sewer, gas, or electric services		N/A
Impact fees for new development	Y	Dry Creek Trust Fund; used for regional flood control projects within the watershed
Storm water utility fee	N	N/A
Incur debt through general obligation bonds and/or special tax bonds	N	N/A
Incur debt through private activities	N	N/A
Community Development Block Grant	N	N/A
Other federal funding programs	Y	FEMA CTP program for floodplain mapping studies

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
State funding programs	Y	State DWR Prop 84 IRWM grants, DWR Flood Corridor Protection Program grant, DWR USRP grant, and DWR Flood Emergency Response Project grant
Other		
How can these capabilities be expanded and improved to reduce risk?		
The impact fees for new development can be expanded to develop new impact fees on development within the Cross Canal Watershed area. This could be used to fund regional flood control projects, which would reduce flooding risk. Continued pursuit of FEMA CTP grants will help reduce risk by identifying risks through updated and new floodplain mapping. Continued pursuit of State funding will help reduce risk through funding of additional flood control projects and flood warning system expansion and upgrades.		

Source: PCFCWCD

P.6.4. Mitigation Education, Outreach, and Partnerships

Table P-12 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table P-12 PCFCWCD's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	American Basin Watershed Council; District staff attend monthly meetings
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N/A	Utilize resources of Placer County
Natural disaster or safety related school programs	N/A	Utilize resources of Placer County
StormReady certification	N/A	N/A
Firewise Communities certification	N/A	N/A
Public-private partnership initiatives addressing disaster-related issues	Y	FEMA Flood Mitigation Assistance Program (FMA) to assist with residential and commercial building elevation projects
Other		
How can these capabilities be expanded and improved to reduce risk?		
Public outreach can be continued through participation in local citizen groups and non-profit organizations. This will help to reduce risk through the active engagement of stakeholders to identify risks and hazards. Public educational efforts regarding the FMA can be expanded when there is additional interest in elevation projects. These projects provide mitigation by making structures more resilient to flood hazards.		

Source: PCFCWCD

The District boundaries are the boundaries of Placer County. District programs are accomplished through a cooperative effort involving Placer County and all of the municipalities in the County which include: the City of Auburn, City of Colfax, City of Lincoln, Town of Loomis, City of Rocklin, and City of Roseville. In addition, cooperative agreements have been established with Sacramento and Sutter Counties for addressing issues in commonly shared watersheds, and other governmental agencies, such as Reclamation District 1001, the Nevada Irrigation District, and the Placer County Water Agency who also participate in District programs.

The cities and County formally adopted a Coordination Agreement in February 1986, which was also reaffirmed with minor changes in 1997. The agreement identifies mutual responsibilities and established the Technical Advisory Committee and the Policy Advisory Committee as forums for formulating standards, policies, and programs to be recommended to the Board of Directors.

P.6.5. Other Mitigation Efforts

The District is involved in a variety of mitigation activities including public outreach and project activities. These mitigation activities include:

- Provides information and support to the public on flood and drought related issues
- Collects and interprets data from a network of stream and precipitation gages operated by the District and others
- Collects data and coordinates with the National Weather Service
- Performs annual stream maintenance on the Dry Creek Watershed
- Provides technical support to the cities, county, and private sector by reviewing plans for public and private lands and for policy issues in flood control, drainage, and related areas
- Develops and implement master plans for key watersheds
- Supports regional floodplain management, including coordination with the NFIP
- Participates on special flood control and drainage projects.

Specific accomplishments of the District since the 2005 LHMP include:

2004: Land acquisition is completed for the 26 acre Miners Ravine off-channel basin project in Roseville. Major consulting contract for the Miners Ravine off-channel basin facility including planning, permitting, design, and construction oversight is awarded and begun. Land acquisition negotiations begin for proposed Secret Ravine floodplain restoration site in Rocklin. A study of remaining alternative regional detention sites in the Dry Creek Watershed is completed with no viable sites found. ALERT system software upgrades and three new gage installations are completed. An electronic version of the District's Stormwater Management Manual (SWMM) as well as Board meeting agenda/minutes are posted to the web. Biennial audit is completed. Work on development of the County's Local Hazard Mitigation Plan per the Disaster Mitigation Act of 2000 is completed.

2005: The District is awarded \$300,000 from the State Department of Water Resources under the Urban Streams Restoration Program and the District procures a consultant to perform planning, design, permitting, and construction oversight of the Secret Ravine floodplain restoration project. A new five-year MOU with the Department of Fish and Game is finalized for continued Dry Creek watershed stream channel maintenance activities. Planning and design of the Miners Ravine off-channel detention basin project

reaches a 95 percent level of completion. An update of the District's Flood Response Handbook is completed and distributed.

2006: District staff respond to the New Year's Day flooding event by helping activate the County's emergency operation center and by providing technical assistance as necessary. The Board approves all CEQA related documents and construction bid documents for the Miners Ravine Off-Channel Detention Basin Facility. Construction bids are received, all necessary permits are obtained, a construction contract is awarded, and construction commences on the Miners Ravine Facility in August. Construction reaches an approximate 70 percent completion level prior to winterization of the Miners Ravine site in early November. Planning and design of the Secret Ravine Floodplain restoration project begins and reaches an approximate 30 percent completion level by the end of the year. The District's ALERT flood warning software system is upgraded to the web-based Contrail system and plans are approved to install up to seven new gages.

2007: Construction of the Miners Ravine Off-Channel Detention Basin Facility is completed and the start of long-term operations and maintenance activities begins. A five year long vegetation and debris maintenance contract is executed with the California Conservation Corps (CCC) for the Miners Facility. The Secret Ravine Floodplain Restoration Project is placed on hold and an existing grant with the Department of Water Resources (DWR) is terminated due to easement acquisition difficulties and limited benefits of the proposed project. A \$2.8 million grant application for the Scilacci Farms Flood and Conservation Easement Project on Raccoon Creek is submitted to the DWR Flood Protection Corridor Program. Six new ALERT stream level and precipitation gages are purchased, installed and made operational within the District's ALERT system of gages. A professional services agreement is awarded to complete an update to the 1992 dated Dry Creek Watershed Flood Control Plan.

2008: Significant progress is made towards completing the update to the 1992 dated Dry Creek Watershed Flood Control Plan. The District's Miners Ravine Off-Channel Detention Basin Facility wins an award for engineering excellence and long term operations, maintenance, and monitoring activities continue at the facility. The Scilacci Farms Flood and Conservation Easement project is submitted to the State of California Department of Conservation grant program for consideration. FEMA coordinates with District to release results of 60 miles of creek study revisions and digitized floodplain mapping.

2010: The updated Dry Creek Watershed Flood Control Plan is released for public and agency review and presentations to our Board and the public are made. Coordinated with PCWA to submit a joint grant application under the State DWR Prop 84 IRWM program for the Antelope Creek Water Efficiency and Flood Control Project. Adopted the 2010 update to Placer County's Local Hazard Mitigation Plan. Coordinated with FEMA and our member agencies in the release and review of the Digital Flood Insurance Rate Maps (DFIRMS). Approved billing rates and methodology for reimbursement of all District staff time spent on development review submittals. Completed job classification studies of the District staff positions.

2011: The District receives a \$741,000 grant award under the State DWR Prop 84 IRWM program to assist with Phase 1 of the Antelope Creek Water Efficiency and Flood Control project and procures professional consulting services to assist with the project. The District Board accepts the 2011 Update to the Dry Creek Watershed Flood Control Plan as final and directs staff to move forward with the required financial nexus study and compliance under CEQA. The District receives a \$300,000 federal grant award through a FEMA

Cooperating Technical Partnership and begins detailed floodplain mapping studies of six creeks in Placer County. Major upgrades to the District's website are completed. The District updated the DCWS plan. It was finalized in 2011.

2012: The District begins work on the preliminary design, permitting and flood easements for the regional Antelope Creek Flood Control project. Considerable progress is made towards completion of a filing under CEQA and financial nexus studies for the 2011 Update to the Dry Creek Watershed Flood Control Plan. The District and its consultant make considerable progress towards completion of the FEMA Cooperating Technical Partnership project including detailed floodplain mapping studies of six creeks in Placer County. FEMA completes additional LIDAR topographic surveys for remaining portions of County. Staff provide information to member agencies regarding local legislative impacts of newly adopted State Department of Water Resources Central Valley Flood Protection Plan and Senate Bill 5 requirements.

2013: CEQA is completed for the Antelope Creek Flood Control Project and the project planning and design reaches a 65% level of completion. The City of Roseville and Placer County enter into a MOU to provide an additional \$400,000 of funding for this project. A major land acquisition for a flowage easement across private property is also executed for this project. The Board approves of the financial nexus study and revised fee structure recommended from the 2011 Updated Dry Creek Watershed Flood Control Plan. A second Cooperating Technical Partners agreement is entered into with FEMA wherein the District will provide specific duties during the public outreach phase and release of final floodplain mapping of six creeks in Placer County.

2014: Planning and design activities for the Antelope Creek Flood Control Project reach a 100% level of completion in advance of the start of construction anticipated in summer 2015. Required agency permit applications are submitted and additional required flowage easements on both private and publicly held lands are acquired. A grant application is prepared and submitted under the DWR Urban Streams Restoration Program for additional funding necessary to complete the construction of this project. All hydrologic modeling work on the first CTP agreement with FEMA is completed and preliminary floodplain mapping activities begin. A multi-agency Flood Emergency Response planning project gets underway including flood forecasting, flood inundation mapping and emergency response plan updates.

2015: Assisted affected member agencies with meeting the legislative requirements of the State Department of Water Resources new Urban Level of Flood Protection or ULOP (a 200-year protection standard) required by Senate Bill-5. Provided technical assistance during the development of Placer County's reverse 911 type public mass notification system utilized during flood events. Planning, design and permitting activities for the Antelope Creek Flood Control Project continued including processing of an amendment to the CEQA filing and finalizing the purchase of seven flowage easements from the City of Roseville. Final permitting and land acquisition activities associated with the Antelope Creek Flood Control Project continued but delayed the start of project construction until June 2016. FEMA produces preliminary FIRM maps for six new floodplain mapping studies of creeks in western and eastern Placer County. Work on the multi-agency Flood Emergency Response planning project continues including flood forecasting, flood inundation mapping and emergency response plan updates.

2016: Coordinated the public release of preliminary FEMA floodplain maps, including four public outreach meetings. Received a \$500,000 award from FEMA under the existing CTP agreement to restudy and map

an additional 50 miles of creeks within the County. Received a \$400,000 grant award from Department of Water Resources Urban Streams Restoration Program to be utilized towards the construction of the Antelope Creek Flood Control project. Obtained nearly all necessary agency permits and access agreements (excepting the Corps of Engineers 404 permit) necessary to go to construction bid for the Antelope Creek Flood Control project. Completed a 5-year update to our District's annex within the County's Local Hazard Mitigation Plan. Began the work of entering into a 12-year long Routine Maintenance Agreement with the State Department of Fish and Wildlife for permitting relating to the annual stream channel maintenance program. Continued planning and design efforts for an ALERT 2 type upgrade to the District's flood warning system of gages.

2017: Final permits and approvals to begin construction of the Antelope Creek Flood Control Project, Upper Weir were obtained in early 2017. The project went to bid and construction began in June 2017. Construction was substantially completed by the end of December 2017. Staff coordinated closely with FEMA and our local affected member agencies on floodplain mapping studies and the release of new digital FIRM maps under our existing Cooperative Technical Partnership (CTP) with FEMA. Work continued on efforts to enter into a 12-year long Routine Maintenance Agreement with the State Department of Fish and Wildlife for permitting relating to the annual stream channel maintenance program. Continued planning, design, and installation efforts for an ALERT 2 type upgrade to the District's flood warning system of gages.

2018: Construction of the Antelope Creek Flood Control Project, Upper Weir was accepted as complete on February 7, 2018. A professional consulting firm was procured and began work under a five-year agreement to provide long term mitigation, monitoring and reporting services for this project. The District was awarded a grant from the Department of Water Resources to act as the lead agency to complete the ALERT 2 type upgrades to our ALERT system of flood gages. Staff coordinated with the State Department of Fish and Wildlife to obtain a 12-year long Routine Maintenance Agreement to allow the County's annual stream channel maintenance program to continue. The District was awarded a third CTP grant from FEMA to perform floodplain mapping studies on an additional 60 miles of streams, a consultant was procured and work began on this new study. New floodplain maps produced under the second CTP project were presented to the public, finalized, and became effective on November 2, 2018.

2019: The District coordinated with the City of Roseville to complete the multi-year effort upgrading the District's ALERT flood warning system base station, software, and one gage location to ALERT 2 protocol. These upgrades were made possible through Round 2 of the Department of Water Resources Flood Emergency Response Project (FERP) Grant managed by the City of Roseville. Two new ALERT stream level and precipitation gages were also installed and made operational within the District's ALERT system of gages as part of this project.

The Scilacci Farms Flood and Conservation Easement project is approved by the State of California Department of Conservation grant program and executed in January.

2020: The District submitted a Notice of Intent for a fourth CTP grant from FEMA to perform floodplain mapping studies on an additional 33 miles of streams. Coordinated the submittal of the floodplain mapping study information to FEMA for the third CTP grant project.

Annually - Stream Channel Maintenance Program - Placer County annually removes vegetation from selected creek channels to improve flood flows.

P.7 Mitigation Strategy

P.7.1. Mitigation Goals and Objectives

The PCFCWCD adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

P.7.2. Mitigation Actions

The planning team for the PCFCWCD identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. The following hazards were considered a priority for purposes of mitigation action planning:

- Dam Failure
- Drought and Water Shortage
- Flood: 1%/0.2% Annual Chance
- Flood: Localized Stormwater Flooding
- Levee Failure
- Severe Weather: Heavy Rains and Storms
- Wildfire

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 in the Base Plan benefit all jurisdictions whether or not they are the lead agency. Further, many of these mitigation efforts are collaborative efforts among multiple local, state, and federal agencies. In addition, the countywide public outreach action, as well as many of the emergency services actions, apply to all hazards regardless of hazard priority. Collectively, this multi-jurisdictional mitigation strategy includes only those actions and projects which reflect the actual priorities and capacity of each jurisdiction to implement over the next 5-years covered by this plan. It should further be noted, that although a jurisdiction may not have specific projects identified for each priority hazard for the five year coverage of this planning process, each jurisdiction has focused on identifying those projects which are realistic and reasonable for them to implement and would like to preserve their hazard priorities should future projects be identified where the implementing jurisdiction has the future capacity to implement.

Multi-Hazard Actions

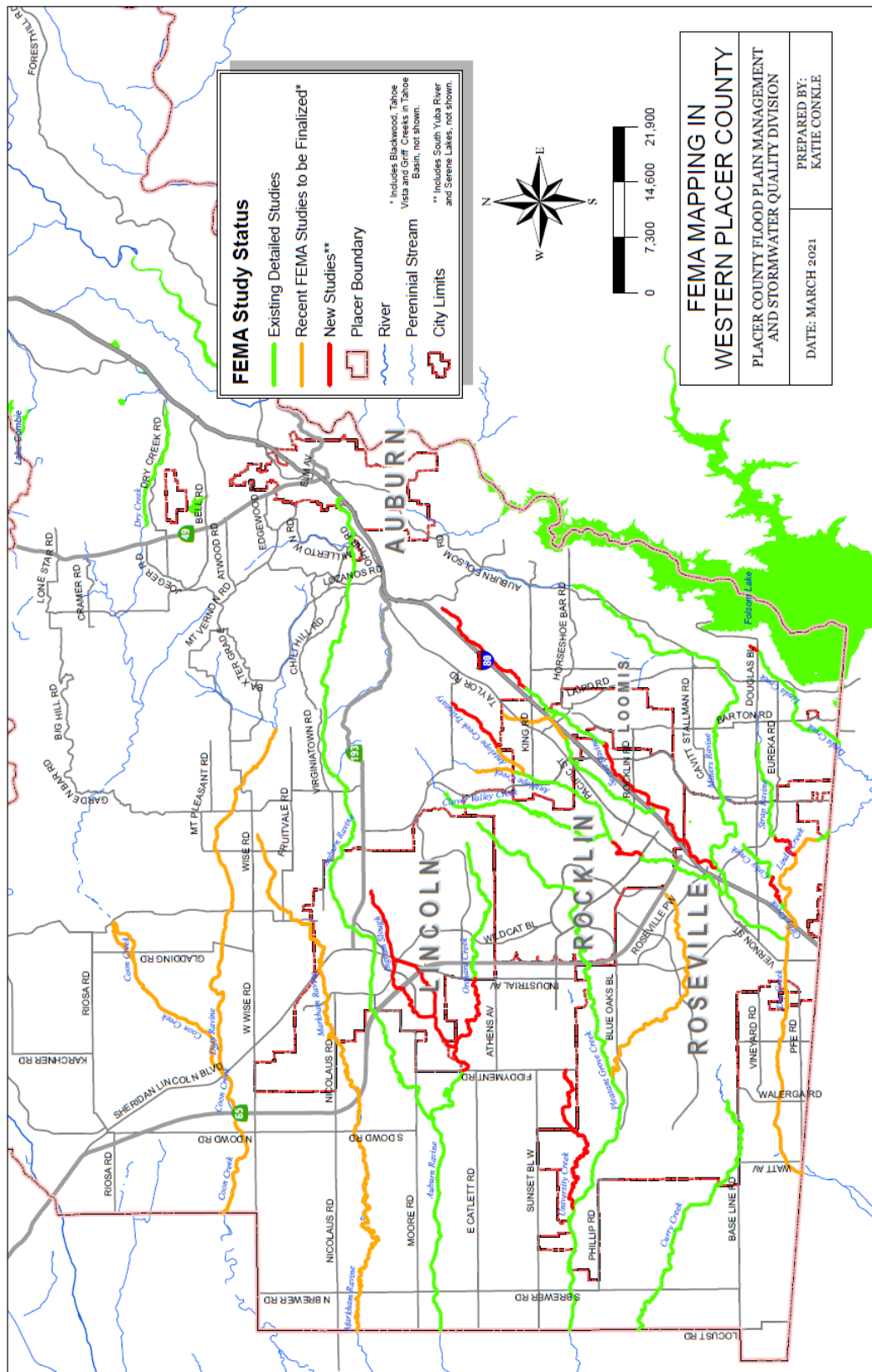
Action 1. FEMA CTP DFIRM Mapping Study

Hazard Addressed: Flooding

Goals Addressed: 1, 2, 3, 4, 5, 7

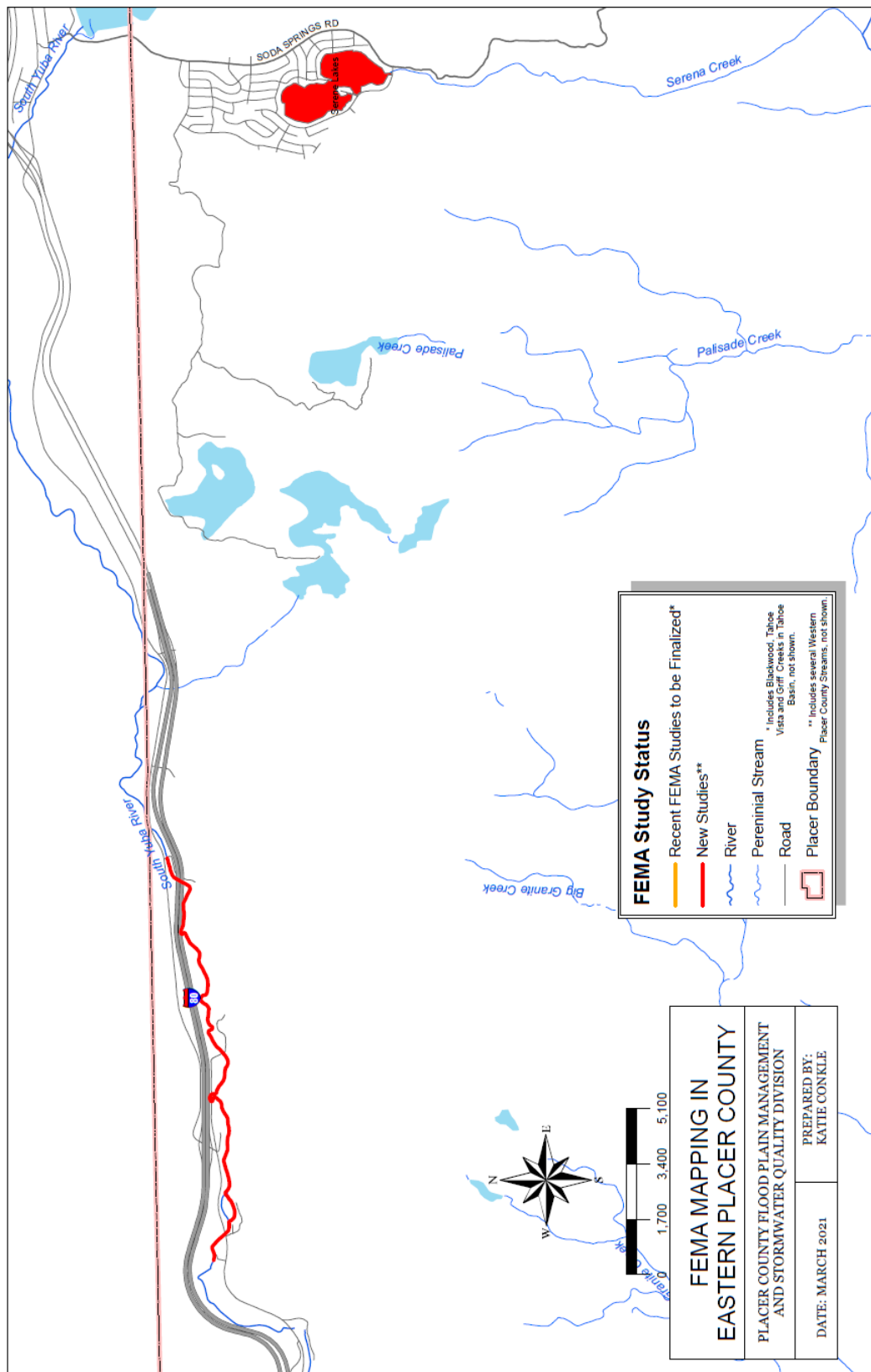
Issue/Background Statement: The Placer County Flood Control and Water Conservation District (District), coordinating closely with local member agencies, has prepared a list of additional study areas within Placer County recommended to be considered for the next round of Risk Map (CTP No. 4) floodplain mapping studies. Eleven areas were identified as priority stream limits, with consideration given to communities at flood risk, population growth, new development, peak flow increases, recent flooding history and changes to special flood hazard areas. A significant portion (approximately 15 miles) of the remaining un-mapped Zone A areas within the County, Roseville, and Lincoln was included in the request. The total length of proposed new study area, including all existing A and AE zone reaches amounts to approximately 33 miles. The map provided below depicts the FEMA FIRM mapping status and proposed new mapping/study reaches for Placer County. This effort would provide hydrologic modeling and data sufficient for FEMA’s contractor to utilize this information to produce future updated DFIRM mapping. The proposed new mapping study areas are shown in Figure P-7 and Figure P-8.

Figure P-7 FEMA CTP Mapping – Western Placer County



Source: PCFCD

Figure P-8 FEMA CTP Mapping – Eastern Placer County



Source: PCFCD

Additional and more accurate DFIRM mapping of new study areas will enable the County to better manage their floodplains and reduce flood risk.

Other Alternatives: No action; maintain current mapping

Existing Planning Mechanisms through which Action Will be Implemented: FIS/DFIRM

Responsible Office: Placer County Flood Control District, FEMA

Priority (H, M, L): High

Cost Estimate: As a Cooperating Technical Partner, the District would be able to cost-share by providing in-kind professional labor services, existing hydrologic models, topographic field data (LIDAR), and other background information on the proposed study areas as has been done in the past.

Benefits (Losses Avoided): Increased understanding of flood risk in the County. Better mapping to prevent citizens from building in the floodplain and reducing resulting NFIP flood claims.

Potential Funding: FEMA CTP, District General Fund

Schedule: The CTP No. 3 preliminary mapping will be completed in 2021. Update of the physical DFIRM maps will occur several years later. The CTP No. 4 project is anticipated to begin in 2022.

Action 2. *Pursue Regional Detention and Retention Projects within the Dry Creek and Cross Canal Watersheds*

Hazard Addressed: Flooding

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background Statement: Historically, flooding in the Dry Creek and Cross Canal watersheds has been a major concern. Placer County is not only concerned with existing flooding problems, but with future problems resulting from increased growth and development in the area. Specifically, this action recommends projects be pursued for regional detention and retention within the Dry Creek and Cross Canal watersheds. Implementation of the regional Antelope Creek Flood Control Project is currently the highest regional priority project for the District. This site was identified within the updated 2011 Dry Creek Watershed Flood Control Plan prepared for the District. The first phase of the Antelope Creek Flood Control Project (i.e., the upstream weir of two proposed) was completed in 2018. Implementation of regional detention and retention projects will reduce future flood-related losses. It is recommended the District continue to attempt to partner with Placer County regarding a possible regional retention project on the Scilacci Farms project in the Cross Canal watershed, along Raccoon Creek.

Other Alternatives: No action.

Existing Planning Mechanisms through which Action Will be Implemented:

Responsible Office: Placer County Flood Control and Water Conservation District, in conjunction with its member agencies.

Priority (H, M, L): High

Cost Estimate: \$20 million +

Benefits (Losses Avoided): Life safety; reduction in property loss.

Potential Funding: HGMP, PDM, Dry Creek Trust Fund, other grants (federal, state).

Schedule: Within ten years.

Action 3. *Update the Flood Control Plan for the Cross Canal Watershed*

Hazard Addressed: Flooding

Goals Addressed: 1, 2, 3, 4, 5, 7

Issue/Background Statement: The flood control plan for the Cross Canal watersheds is outdated having been performed in 1993. Rapid urbanization within this watershed has occurred and is projected to continue with significant impacts to creeks within the watershed due to increasing amounts of impervious surfaces and altered land uses. Updated hydrology and hydraulic models are now available for most creeks within this watershed and can be referenced for both flood control and land use planning purposes.

Other Alternatives: Continue to review urbanization projects with outdated models.

Existing Planning Mechanisms through which Action Will be Implemented:

Responsible Office: Placer County Flood Control and Water Conservation District and its member agencies.

Priority (H, M, L): High

Cost Estimate: \$500,000

Benefits (Losses Avoided): Improved flood control and land use planning capabilities throughout western Placer County.

Potential Funding: Placer County Flood Control District reserves, PDM, State Planning Grants

Schedule: Immediate and ongoing.

Action 4. *Upgrade Flood Warning System to ALERT 2, Add Additional Gage Locations and Flood Forecasting Capabilities*

Hazard Addressed: Flooding

Issue/Background Statement: The Placer County Flood Control District, in conjunction with OES, has installed an ALERT flood warning system in the County consisting of 18 precipitation and stream level gages. The regional system, including ALERT gages owned and operated by the City of Roseville and Sacramento County, consists of approximately 102 rain gages and 84 stream gages. Additionally, the District monitors several rain and stream gages in the Truckee River Watershed. These ALERT gages provide the District with real-time rainfall amounts and stream level data. An upgraded system to include ALERT 2 type improvements, as well as real time flood warning gages and flood forecasting capabilities for flood-prone areas would increase the warning time for implementation of effective mitigation measures and necessary evacuations. The ALERT 2 type upgrades are being funded by the State DWR FERP program. The ALERT 2 base station improvements were implemented in 2019 with Round 2 of the FERP grant managed by the City of Roseville. The individual site upgrades will occur over the next two years under Round 3 of the FERP managed by the District.

Other Alternatives: No action – continue with current plan

Existing Planning Mechanisms through which Action Will be Implemented:

Responsible Office: Placer County Flood Control District and Placer County Office of Emergency Services

Priority (H, M, L): Medium

Cost Estimate: \$100,000

Benefits (Losses Avoided): Life-safety, reduction in property loss, improved warning, increased lead time.

Potential Funding: PDM, HGMP, District reserves.

Schedule: Within two years